

# ***Air Force Institute of Technology***

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## **DoD Enterprise Architecting: Joint Issues Derived From SOF Air Analysis**



**U.S. AIR FORCE**



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1



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## ***Overview***

- Introduction
- Six Step Enterprise Architecture Approach
- Special Operations Forces (SOF) Air Architecture
- DoD And Joint Architecting – Observations And Biases
- Topics for Further Research



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2

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## Introduction

- Project to Analyze & Model SOF Air ops activities
  - Assist SOF Air community determine critical processes
  - Results to aid SOF Air: shortfalls, training, funding
- SOF Air Is...
  - Inherently joint at **tactical** level
  - Designated AF and Army units
  - Unique application of air power



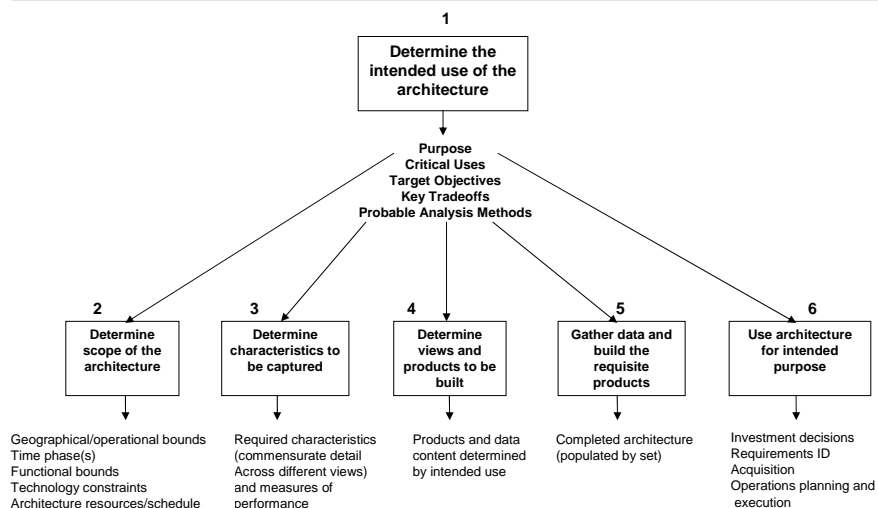
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## DoDAF 6-Step Enterprise Architecture Approach



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    A0 --> A2[A2 Perform Detailed Mission Planning]
    A0 --> A3[A3 Coordinate Support Requests]
    A0 --> A4[A4 Synchronize Mission Details]
    A0 --> A5[A5 Review]

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    A3 --> A3_3[A3.3 Confirm Support Requests]

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    A4 --> A4_2[A4.2 Develop Execution Checklist]
    A4 --> A4_3[A4.3 Issue Sync Matrix]
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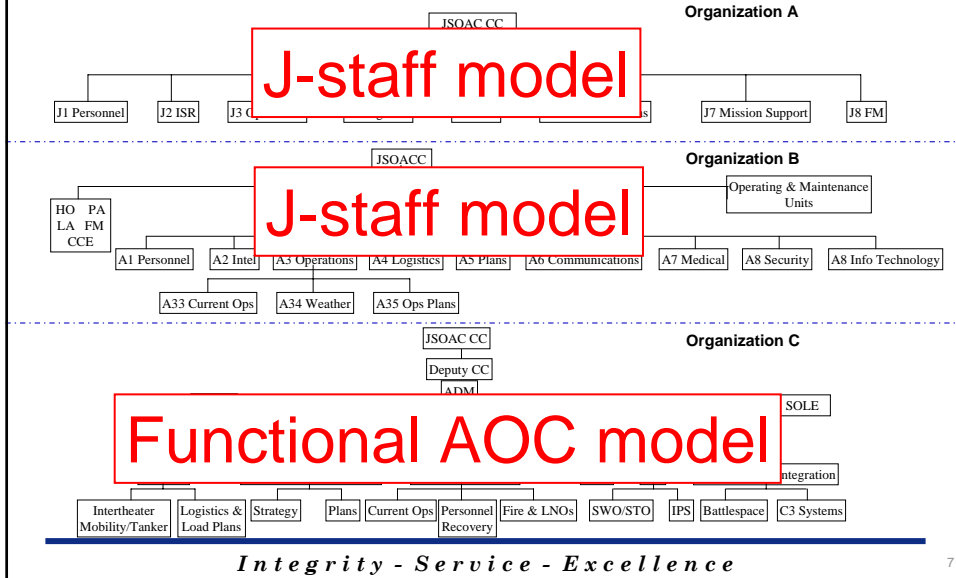
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## OV-4 Organization Charts



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## DoD And Joint Architecting: Observations And Biases

- The Architecture Team
- Common Lexicon
- Process Ownership
- Appropriate Abstraction
- Organizational Bias
- Level of War Bias
- Hollow Transfer Activities



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## Building The Architecture Team

- 1 SOF pilot, 2 fighter pilots, 1 civil engineer
- All familiar with DoDAF architecture views
- One SME & most familiar with operations
- Essential for team to have a good mix of SMEs and systems architects
- 2 Elements - Core team and network of SMEs



### HEURISTICS:

- *Lack of experience in the domain = architecting pain*
- *A readily available network of SMEs makes the architecture relevant*

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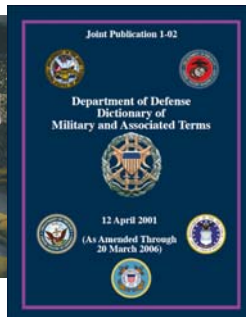
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## Common Lexicon

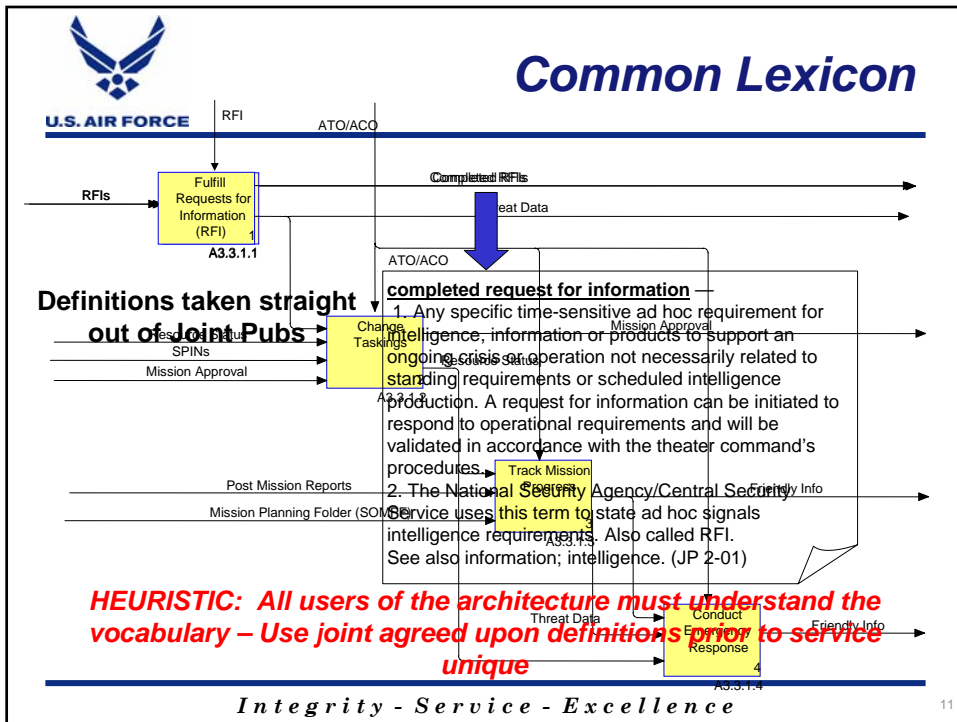
- Differences in vocabulary between services
- Rock Drill vs. Rehearsal
  - Deck (USN) = Ground (AF)
  - Latrine (USA) = Head (USN)



- DoD Dictionary & Joint/Multi-service publications provide common ground


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10


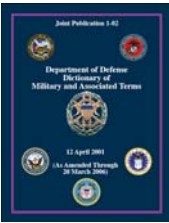


# Process Ownership

- Overlapping guidance from multiple organizations & services



- Unofficial versus official guidance

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12



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## Process Ownership

Who owns the process?

- Multiple stakeholders in joint processes
- Common process requires buy-in
- Owner needs to be designated for irreconcilable differences



**HEURISTIC:** When establishing an enterprise-wide operational architecture, there needs to be one benevolent dictator to overcome irreconcilable differences

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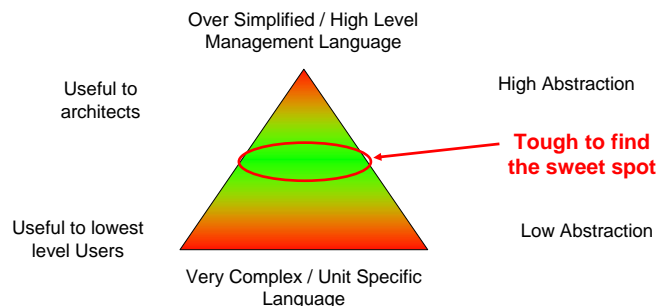
13



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## Appropriate Abstraction

Abstraction vs. Usefulness of the Model



**HEURISTIC:** Architect at the level of abstraction that answers the questions. The abstraction level will be determined by the stakeholder with the lowest level abstraction needs/questions.

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14

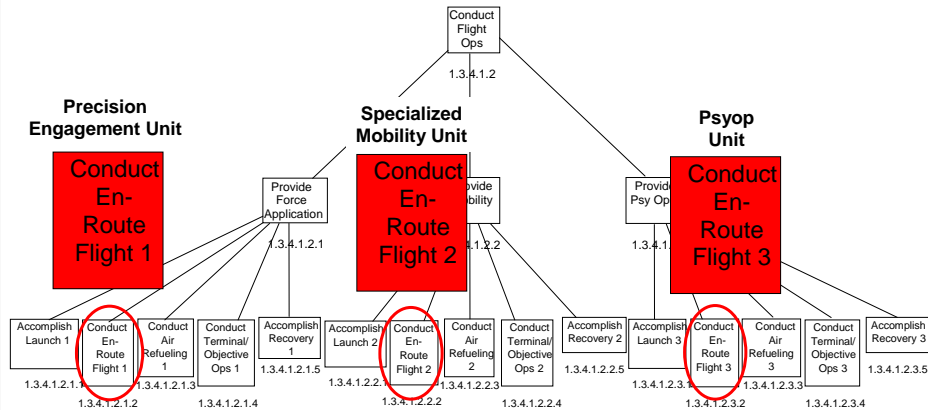




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## Organizational Bias

Old Node Tree decomposed with organizational baggage



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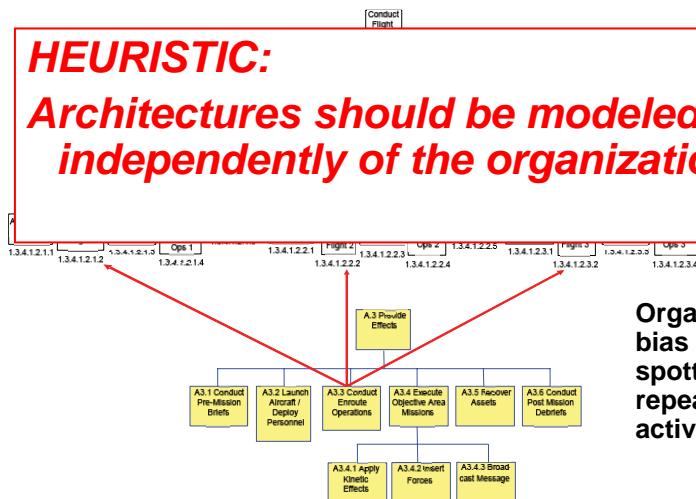
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## Organizational Bias

**HEURISTIC:**  
Architectures should be modeled  
independently of the organization



Organizational  
bias can be  
spotted by  
repeated  
activities

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## Level of War Bias

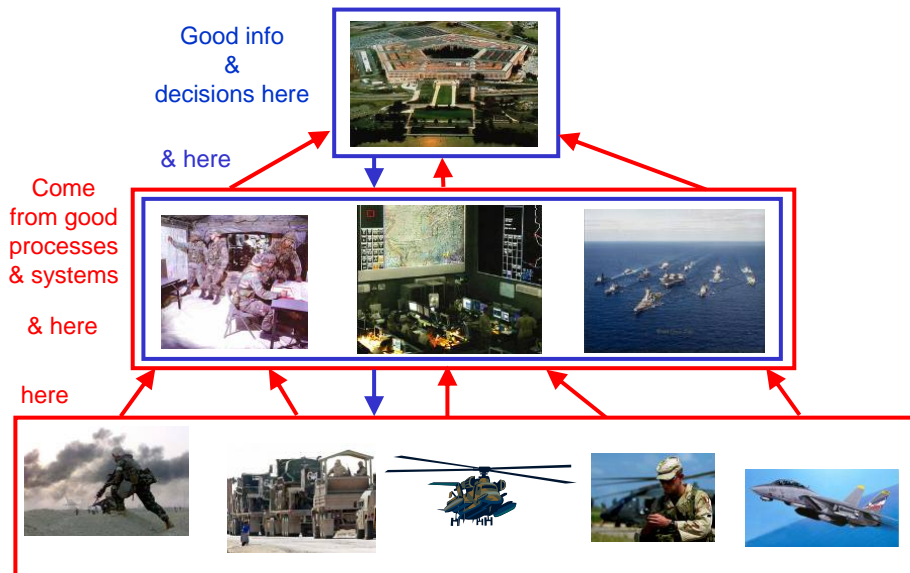
- Military architectures/systems/personnel tend to focus on either operational level or tactical level, not both
- Operational Level
  - Focused on major operations and providing the means by which tactical successes are exploited
  - Parts of Air Operations Center, Major Headquarters
- Tactical Level
  - Focused on battles and engagements
  - Squadron, Aircraft, Airman, Soldier

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17



## Level of War Bias



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18



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## Level of War Bias

- Systems tend to be built to satisfy needs of only one level
  - TBMCS-FL
  - TBMCS-UL
- Processes do not follow operational and tactical level boundaries
  - Stream back forth across both levels
  - Flow is key to net-centric operations
- **Heuristic: When architecting DoD systems, do not limit context to operational or tactical level if not necessary – follow the process/flow**

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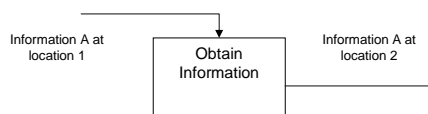
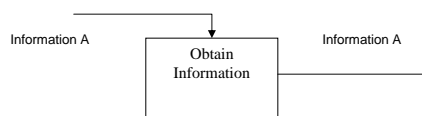
19



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## Hollow Transfer Activities

- Move information, do not transform it
- Indicated with terms such as
  - Obtain
  - Receive
  - Transmit
  - Issue
  - Distribute
  - Submit
  - Store
- Information class with location attribute



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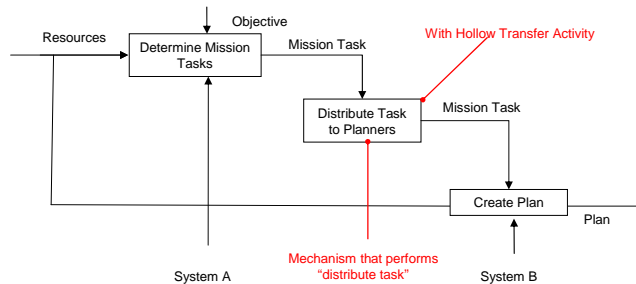
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## Hollow Transfer Activities

### ■ With Visibility



- Can see key activity and apply mechanism
- SV functions map to OV activities

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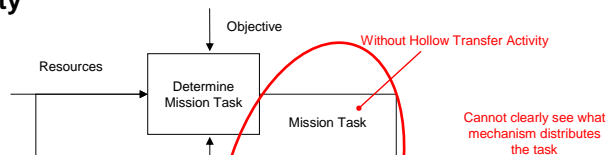
21



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## Hollow Transfer Activities

### ■ Without Visibility



**Heuristic: Be critical of Hollow Transfer Activities; ensure they have the appropriate visibility**

- Can lose visibility on transfer activity
  - Capability/systems gap
  - Lack of interoperability

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22



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## Observations Summary

- **The Architecture Team**
  - Lack of experience in the domain = architecting pain
  - Need for an available network of SMEs (still in the field)
- **Common Lexicon**
  - All users of the architecture must understand the vocabulary
- **Process Ownership**
  - When establishing an enterprise wide operational architect, there needs to be a boss
- **Appropriate Abstraction**
  - Architect at the highest level of abstraction which provides the most insight for the user

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23



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## Observations Summary

- **Organizational Bias**
  - People tend to think organization first, not process
  - Architectures should be modeled independent of the organization
- **Level of War Bias**
  - When architecting DoD systems, do not limit context to operational or tactical level if not necessary – follow the process/flow
- **Hollow Transfer Activities**
  - Be critical of Hollow Information Transfer Activities, ensure they have the appropriate visibility

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24



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## Topics for Further Research

- **Object Oriented or Structured Analysis?**
  - Which one best for capturing info flow
  - Which one best for modeling DoD organizational based processes
- **What models best capture Hollow Transfer Activities?**
  - As TPPU evolves in systems, how do we ensure the information flows are not dropped from architecture
- **AFSO21, BPR, and DoDAF – how do they mix?**
- **Constraints based architecture?**
  - Start with organization/systems, then build operational architecture

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25

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### QUESTIONS???



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26



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## ■ Backup

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## *Steps 1 - 3*

- **Step 1: Determine the Intended Use of the Architecture**
  - Used to identify shortfalls, enhance training, allocate funding
  - Document standard core processes
  - Present at JSOAC conference for workshop
- **Step 2: Determine the Scope of the Architecture**
  - Limited to “Conduct SOF Air Operations” phase
  - Deployment, re-deployment, & support not included
  - Activities when forces in place & prepared to execute
- **Step 3: Determine the Characteristics to be Captured**
  - Find standard information flows & operational activities required to execute SOF Air operations
  - Independent of organizational restrictions—Difficult in SOF Air
  - Independent of traditional levels of war

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## Steps 4 - 6

- **Step 4: Determining Views & Products to be Built**
  - Primary focus was OV-5 Node Tree & Activity Models
  - Limited by project time line (.3 man years)
  - OV-4 Organizational Relationship models used in analysis to separate organization from processes
  
- **Step 5: Gathering Data & Build Requisite Products**
  - Most time-consuming step (85%) – extensive research
  - OV-4 Organization Chart – no orgs were the same
  - OV-5 Node Tree – analyzed existing (incomplete), produced new
  - OV-5 Activity Model – analyzed existing (incomplete), created new streamlined models

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29



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## Step 5: Publications Reviewed

- Joint Publication 3-05, *Doctrine for Joint Special Operation*, 17 Dec 2004
- Joint Publication 3-05.1, *Joint Tactics, Techniques, and Procedures for Joint Special Operations Task Force Operations*, 19 Dec 2001
- Joint Publication 3-05.2, *Joint Tactics, Techniques, and Procedures for Special Operations Targeting and Mission Planning*, 23 May 2003
- Joint Publication 3-30, *Command and Control for Joint Air Operations*, 05 Jun 2003
- USSOCOM Directive 525-8, *Joint Special Operations Air Component (JSOAC)*, 26 Jan 1999
- USSOCOM Directive 525-7, *Special Operations Liaison Element (SOLE)*, 28 Mar 2003
- 352 SOG Instruction 10-202, *Air Force Special Operations Component Europe (AFSOCEUR) Structure and Procedures*, 01 Sep 2005
- USPACOM JSOAC Operating Instruction, *United States Pacific Command Theater Special Operations Air Component (USPACOM TSOAC) Joint Special Operations Air Component Operating Instruction*, 21 Apr 2005 (RevC - Draft)
- SOCCENT C/JSOAC J3 Annex, *Combined Joint Special Operations Air Component (CJSOAC) Standard Operating Procedure*, 04 Mar 2005
- AFSOC Instruction 13-102, *Joint Special Operations Air component (JSOAC)*, 09 May 2006 (Draft)
- AFSOC Instruction 13-101, *Operational Procedures Special Operations Liaison Element (SOLE)*, 01 Aug 2005
- Hurlburt Field Instruction 10-402, *Air Force Special Operations Component (AFSOC) Operations*, 05 Apr 1996 (AFSOF)
- AF Doctrine Document 2-7, *Special Operations*, 16 Dec 2005
- AF Instruction 13-1AOC, Volume 3, *Operational Procedures – Air and Space Operations Center*, 01 Aug 2005
- AF Operational Tactics, Techniques, and Procedures 2-3.1, *USAF Command and Control Nodes*, 30 Dec 2004 (C2 Nodes)
- AF Operational Tactics, Techniques, and Procedures 2-3.2, *Air and Space Operations Center*, 13 Dec 2004
- Field Manual 1-108, *Doctrine for Army Special Operations Aviation Forces*, 03 Nov 1993

**Very extensive governing publications review**

*Integrity - Service - Excellence*

30



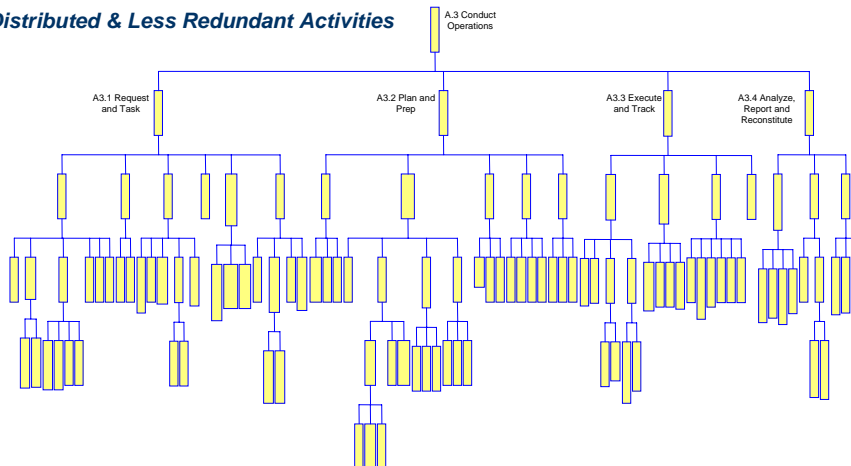


- **Step 4: Determining Views & Products to be Built**
  - Primary focus was OV-5 Node Tree & Activity Models
  - OV-4 Organizational Relationship models used in analysis to separate organization from processes
- **Step 5: Gathering Data & Build Requisite Products**
  - Most time-consuming step (85%) – extensive research
  - OV-4 Organization Chart – no orgs were the same
  - OV-5 Node Tree – analyzed existing (incomplete), produced new
  - OV-5 Activity Model – analyzed existing (incomplete), created new streamlined models
- **Step 6: Use Architecture for Intended Purpose**
  - Presented at conference/workshopped for 2 days
  - Used to assign organization and system mechanisms
  - Accepted by SOF Air as start to new baseline – living architecture

31



### ***Distributed & Less Redundant Activities***



32